

In re Patent Application of:

PHILLIPS ET AL.

Serial No. **10/706,142**

Filed: **11/12/2003**

REMARKS

This is in response to a final action.

Claims 1 and 3-7 are currently pending in this application.

Claims 1 and 7 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Uyama et al.

Claims 3 and 4 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Uyama et al in view of Coombs et al -530 for reasons of record.

Claims 5 and 6 are rejected under 35 U.S.C 103 (a) as being unpatentable over Uyama et al in view of the admitted prior art for reasons of record.

In the office action it is said that applicant's arguments filed May 1, 2007 have been fully considered but they are not persuasive.

In the office action mailed 01/17/2007 the examiner stated:

"First of all, it is respectfully submitted that the placement of the color shifting layer with respect to the interference pattern would have no bearing on the appearance of the color shift property of the security article. Concerning this, the examiner's rationale given in the Final Rejection of case serial number 10/705,610, paragraphs 7 and 8, is hereby made of record. To wit, the examiner stated that it made no difference in Uyama et al whether the light is transmitted or reflected through

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the color shift coating, since the reference teaches that the color shift will be observed for either - see column 6, lines 1-11 and 25-34 of Uyama et al. Since the substrate is transparent, it would not affect the color shifting property of the color shifting layer." (underlining added)

The examiner also states that:

"Applicant should note, as pointed out in the aforementioned final, that the light path for the instant application and that for Uyama et al are as follows:

Instant: Incident light - Interference pattern-
Substrate-Color shift coating

Uyama et al: Incident light - Substrate- Interference
pattern - Color shift coating

Unless the substrate has some optical property in either the instant or in Uyama et al- and nothing is disclosed of such property, as the substrates are said to be transparent- the incident light clearly undergoes the same path and would therefore be subjected to the same effects due to the optical effects of the layers."

It is abundantly clear to the reader of the passages above, that the examiner is of the opinion that incident light undergoes a same path and would therefore be subjected to the same effects whether the color shifting coating was on a same side of the

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substrate as the interference pattern, or whether it was on an opposite side of the substrate from the interference pattern.

Notwithstanding, after viewing the samples provided by the applicant, the examiner states that:

"Upon reviewing the exhibits, it is agreed that there is **some visual** difference with some of the exhibits, the difference being the intensity or brightness of the hologram."

It would appear as if there is some inconsistency in the examiner's comments; the examiner stated in a previous office action that "since the substrate is transparent, it would not affect the color shifting property of the color shifting layer." (underlining added) Furthermore the examiner stated that " the incident light clearly undergoes the same path and would therefore be subjected to the same effects due to the optical effects of the layers."

However, this is clearly not the case. As the samples provided to the examiner show and as the examiner has now acknowledged, there is **some visual** difference in providing the color shifting coating on a same side or opposite side of the substrate from the interference pattern; and from the examiner's comments one can see that this was an **unexpected** result.

Nevertheless, in the instant office action the examiner has stated that this difference is not considered to be significant enough to warrant patentability for two reasons.

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The office action says: "First of all, the difference is not that marked in Exhibit 2, 3, and 4, and hardly noticeable in Exhibit 6 - It is greatest in Exhibit 5."

The applicant is nonplussed at this remark.

The applicant had samples prepared placing a color shifting coating on a same side of the substrate and on an opposite side of the substrate from the interference pattern.

In Exhibits 2 through 6 different coatings were used; however Exhibit 2a and 2b were coated with the same coating materials and same coating thicknesses. As well Exhibit 3a and 3b were coated with same coating materials and same coating thicknesses. Furthermore Exhibit 5a and 5b were coated with the same coating materials and same coating thicknesses; and Exhibit 6a and 6b were coated with the same coating materials and same coating thicknesses.

However, since Exhibit 2, 3 4, 5, and 6 were coated with different coatings, it should be expected that different visual results would occur. For example the examiner noted that Exhibit 5 had the greatest "visual" difference. That being said, this is not a reason to reject patentability of the claims. It has no bearing on the patentability of the claims. There is no requirement in the statute or in the MPEP that different samples made with different coatings yield a same visual difference. Yet the examiner has stated: "However, the difference is not

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consistently noticeable in all examples. i.e. The difference is in degree, not kind, and hence does not rise to the level of something unexpected."

It should be noted that the difference between different samples made by having the color shifting coating on an opposite side of the substrate from the interference pattern is in degree. However the difference in all of these samples and the samples wherein the color shifting coating and interference pattern is on a same side "is" a difference in kind. The group of samples made in accordance with the claimed invention has a decoupling effect between diffraction and color shifting. This is a difference in kind from the samples made with both structures on the same side of the substrate.

The applicant would like to make clear that in all instances in all samples there was a difference in the samples where the substrate had the color shifting coating and the interference pattern on the same side or opposite sides of the substrate. In all instances there was some decoupling between the effects of color shifting coating and the interference pattern. This was acknowledged by an expert by way of a declaration provided to the examiner and the examiner himself acknowledged a visual difference that clearly he must believe was unexpected given his earlier conviction that it would have made no difference since the substrate is transparent to light.

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The examiner also states that the second reason for rejection is: "-because-secondly-- the difference is really dependent on what angle the hologram is looked at and to some extent what lighting is present. Certainly at angles, there is hardly any difference in the holograms. Only Exhibit 5 shows a marked difference, where the inventive hologram is barely visible. However the prior art hologram is less visible in Exhibit 5. ... Hence it would appear that the difference in effect is somewhat dependent on figure use in the hologram and certainly on angle viewed."

Once again the applicant is surprised by the examiner's statements. The applicant has provided an interference structure on one side of a light transmissive substrate. The visual effects of such a structure are dependent on the angle of viewing or the angle of incident light. The applicant has also provided on an opposite side of the light transmissive substrate a color shifting coating that has visual effects that are angle dependent; that is, the effects depend upon the angle of viewing and or the angle of incident light. However the examiner's comments seem to suggest that is angle dependence is reason to reject patentability or has a bearing on the rejection of the claims. This is not understood.

The applicant has provided a structure that differs structurally and functionally from the prior art. The provision of a color shifting coating and an interference pattern on opposite sides of a substrate provides for some decoupling of the effects of the color shifting coating and the interference pattern.

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The examiner in the office action has stated that it is certainly agreed with that inventive exhibits are different from the prior art in a "subtle" way - at least when looked at straight on (again, at angles, the differences are not so marked). "However, there certainly is no showing that these differences, be they subtle or not, would provide any unexpected benefit in the field of security coatings."

As was pointed out in the Declaration from Garth Zambory filed heretofore in a response in this application, he stated: "With regard to the claimed invention in the '142 application, the light transmissive substrate inherently serves as a "decoupling layer" to substantially separate the holographic effects from the color shifting effects, whereas the holographic effects and color shifting effects in the prior art will always intimately interact/interfere with each other as they share a common boundary layer."

Mr. Zambory further stated:

"For example in the image of a wine glass in 3a, made with the color shifting coating and hologram on opposite sides of the substrate, there are angles of view where only the thin film color is seen. In particular, there is a green color at angle where no diffraction is seen. This provides a particular, and somewhat unique, form of security not found in the type of structure wherein the color shifting layers and hologram are on the same side, in that the device flips from a diffractive image to only a thin film image (due to decoupling). Such a security feature,

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where the holographic image completely disappears at a discrete angle, would be more difficult to simulate or counterfeit than a feature in which the color shift and holographic effects we [sic - were] always both present, as is the case in sample 3b.

"As I have observed, the image in sample 2a of Exhibit A, which has the color shifting coating on an opposite side of the substrate from the hologram has an image that is more muted than that of sample 2b made by having the hologram and color shifting layers on the same side of the substrate. From my experience, more muted images and colors are more difficult to simulate. That is why pastel colors are often used on banknotes and other high security documents. Color printers and other devices such as scanners, cameras and related output devices have a harder time to accurately replicate a muted color in comparison to a highly bright, high chroma sample. Thus, sample 2a is more difficult to counterfeit than the image seen in sample 2b."

The applicant would like to point out that another advantage of having the color shifting and holographic structures on opposite sides of the substrate is in the manufacturing process. It is easier to manufacture a color shifting structure in a vacuum roll coater where the target substrate is smooth, as with the clear substrate, as compared to depositing the color shifting structure on the rough holographic structure.

There are several advantages to this.

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For example, in manufacturing in a vacuum roll coater, one must be able to monitor the thickness of the depositing layers. This is generally accomplished using either a reflection or transmission monitor using specular light. If a flat surface is presented to the monitor, then the response of the reflected light is related to the thickness, normally measured in quarter waves. Good color control and thickness control is possible in this manner by coating the hologram and the thin film filter on opposite sides of the substrate. Here we have a product with excellent color uniformity which is critical for a security product which is in part due to monitoring the color shift coating on the flat side of the substrate as opposed to monitoring the coating coated over the interference pattern. For instance if there are color differences between different parts of the web, the resultant product has an ambiguity as to whether it is genuine or counterfeit. If an embossed surface is presented to the reflection monitor, then as the embossed web passes under the monitor head, variations of light reaching the aperture of the monitor will occur due to light scattering off the embossed surface. The amount of light will change depending on the particular embossing passing under the monitor. Thus, control of thickness and hence the resultant color of the Fabry Perot filter will be difficult or impossible to control. This is what can happen if one coats directly onto a diffractive surface. In order to coat a diffractive surface, one often provides "lanes" of non-embossed web" passing under the monitor. In this case, one pays a penalty in terms of yield. This is obviated by coating the color shift coating on the non-embossed side of the substrate.

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In the instance where the thin film and the hologram are on opposite sides of the substrate, in accordance with the claimed instant invention, one can easily print text or other information on the flat surface of the substrate with high resolution before coating over it with the Fabry Perot filter. One will see the printing through the transparent hologram and through the PET. Printing on a diffractive surface will have less resolution as the grooves of the hologram will tend to allow the ink to wick. If one considered printing on the flat side of the substrate for the case where the hologram has been coated over with the Fabry Perot filter (all on one side of the substrate), then the printing would have to be protected by an additional layer of polymer to prevent it being scratched off. This is an added step and more costly.

When providing the hologram or interference pattern and the thin film color shifting coating on opposite sides of the substrate, one has the unique situation where only a mirror image is seen from the thin film side (i.e., the Al opaque layer of the thin film filter). In the case where the Fabry filter is coated over the hologram (both being on the same side of the substrate) the hologram replicates down through the optical stack so that instead of a mirror one sees a hologram. Currency sorters can easily check a reflective surface coming from a security ribbon in a banknote but it is more difficult to have a currency sorting machine check for the presence of a holographic image. This invention allows for this.

Therefore, the claimed invention defines an unexpected visual difference from that of the prior art device, and these

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differences do provide unexpected benefits in the field of security coatings.

In view of the foregoing arguments, the applicant respectfully requests reconsideration of the claims in this application which are believed to be allowable over the cited prior art.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 50-1465 and please credit any excess fees to such deposit account.

Respectfully submitted,



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Date